

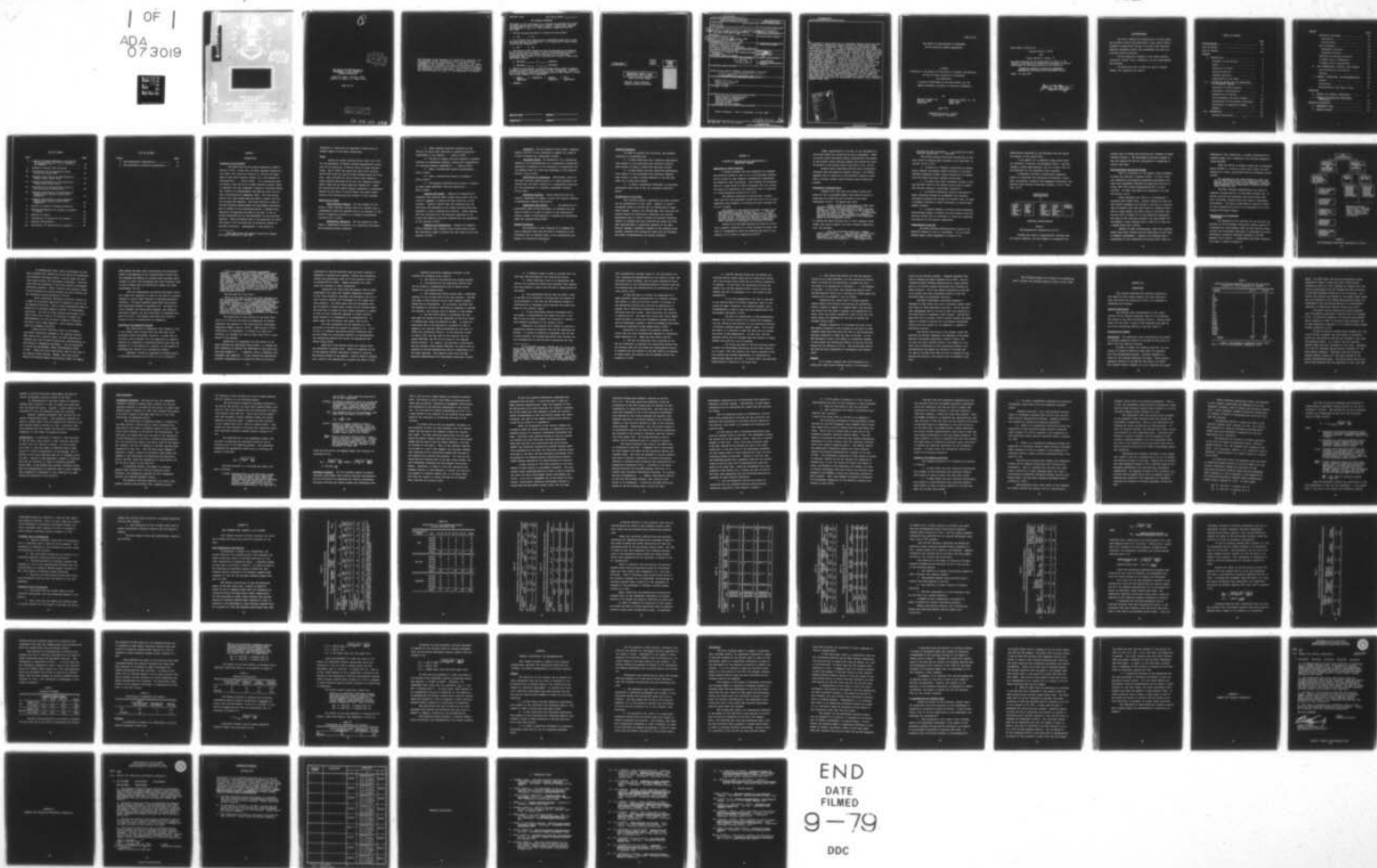
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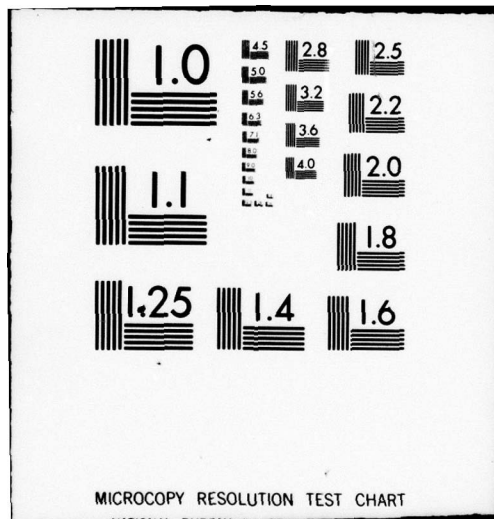
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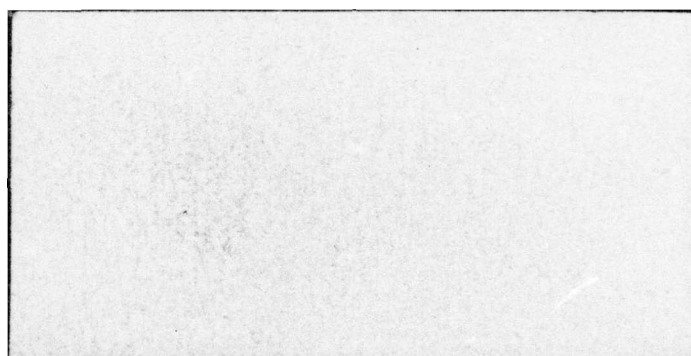
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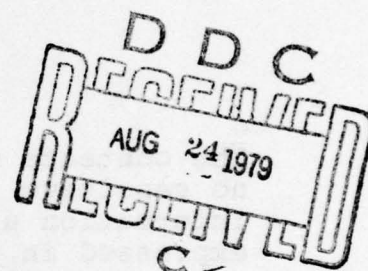
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THE IMPACT OF CERTIFICATES OF
COMPETENCY ON AIR LOGISTICS
CENTER CONTRACTING

Philip R. Davis, Captain, USAF
Charles G. Simko, Jr., Major, USAF

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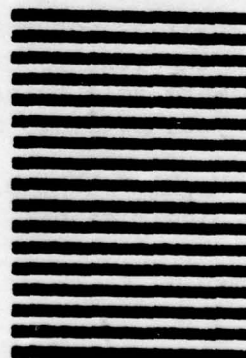
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The purpose of this study was to determine whether there has been a significant difference between contractor performance under Certificate of Competency (COC) issuance and performance where COCs were not issued. If a small business which is low bidder on a government contract is deemed by the contracting officer to lack the responsibility for completing the contract, the Small Business Administration (SBA) must be notified. If the SBA determines that the company is responsible, it issues a COC and the company must be awarded the contract. Despite this authority to direct contract awards, the SBA has no formal responsibility to ensure satisfactory performance. This, it was felt, leads to the potential for more ineffective contractor performance under COCs. To test whether there was a significant difference in performance, selected performance data on both COC and non-COC contracts awarded by the AFLC Air Logistics Centers were analyzed. The variables examined were late contract delivery and the initiation of termination for default proceedings. The research findings show that there was no significant difference in the number of late deliveries between the two categories. There were, however, significantly more cases of termination for default with contracts awarded under COCs.

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THE IMPACT OF CERTIFICATES OF COMPETENCY
ON AIR LOGISTICS CENTER CONTRACTING

A Thesis

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the
Degree of Master of Science in Logistics Management

By

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June 1979

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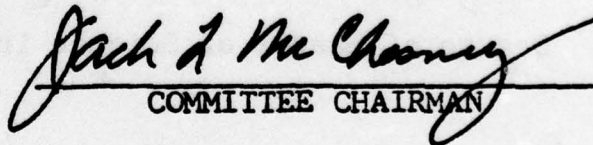
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has been accepted by the undersigned on behalf of the
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CHAPTER I

INTRODUCTION

Statement of the Problem

The Armed Services Procurement Regulation (ASPR)*, Section 1-705.4, states that the Small Business Administration (SBA) "has statutory authority to certify the competency of any small business concern as to all elements of responsibility . . . [18:p.1:124]." If a contracting officer decides that the bid of a small business concern, which is otherwise the most acceptable, should be rejected because that concern is nonresponsible, the SBA may issue the concern a certificate of competency (COC). The contracting officer must then either make the award or appeal the decision through SBA channels. The final decision is made by the SBA Associate Administrator for Procurement Assistance and is binding on the contracting office. Although final decisions on competency are made by the SBA, it has no stated responsibility for the performance of the certified business. These procedures lead to the potential for excessive costs to the Air Force due to contractor default or untimely deliveries. Consequently, a need exists to

*The ASPR became the Defense Acquisition Regulation (DAR) effective 1 June 1978.

determine if certificate of competency issuance has an adverse impact on Air Force contracting.

Scope

During the period covering Fiscal Years (FY) 1973-78, the Department of Defense awarded approximately 20 percent of its contracts, in dollar value, to small business firms. For FY 1978, the amount was about \$10.7 billion. The FY 1978 total for the Air Force reached nearly \$1.9 billion. Over one-third of the Air Force total awards to small business were made by the five Air Logistics Centers (ALCs) under the Air Force Logistics Command (5). Since ALC contracting with small business represents a substantial portion of that done in the Air Force, the study concentrates on ALC contracting data relative to COC issuance.

Definition of Terms

Small Business Concern. For the purpose of this study, a small business concern shall be a concern that is independently owned and operated and is not dominant in the field of operation in which it is bidding on government contracts (20:p.1:103).

Responsible Contractor. For the purpose of this study, a responsible contractor is a contractor that meets the following minimum standards:

1. "Have adequate financial resources or the ability to obtain such resources as required during the performance of the contract . . . [20:p.1:159]."

2. "Be able to comply with the required or proposed delivery or performance schedule, taking into consideration all existing business commitments . . . [20:p.1:159]."

3. "Have a satisfactory record of performance . . . [20:p.1:160]."

4. "Have a satisfactory record of integrity . . . [20:p.1:160]."

5. "Be otherwise qualified and eligible to receive an award under applicable laws and regulations . . . [20:p.1:160]."

Capacity and Credit. Category of responsibility standards that comprise those issues which involve the contractor's ability to perform the work called for by the contract. Capacity implies that the contractor has the facilities and equipment or can obtain the facilities and equipment in time to perform the contract. Credit implies that the contractor has the financial resources or can obtain the financial resources required for the performance of the contract (6:187).

Tenacity and Perseverance. Category of responsibility standards that comprise those issues which involve the contractor's will to perform the work called for by the contract (6:187).

Integrity. For the purpose of this study, integrity implies the will of the contractor to adhere to a code of values of honesty and uprightness (6:186).

Pre-Award Survey. An evaluation, by a contracting officer or his representative, of a prospective contractor's operation to determine if the contractor is responsible and can perform under the terms and conditions of the proposed contract (20:p.1:160).

Certificate of Competency. Certificate, issued by the Small Business Administration to a small business, certifying that the small business is a responsible contractor for the performance of a specific government contract (20:p.1:124).

Delinquent Delivery. Actual failure by the contractor, regardless of reason, to meet the contract delivery or performance schedule (20:p.25:2).

Termination for Default. ". . . the exercise of a contractual right of the Government to terminate the contract in whole or in part by reason of the contractor's failure, actual or anticipatory, to perform his obligations under the contract [20:p.8:33]."

Research Objective

The objective of this research is to examine contract information from the five ALCs to determine if COC procedures have an adverse impact on ALC contracting with respect to contractor performance.

Research Questions

In order to satisfy this objective, the research questions to be answered are:

1. To what extent has poor contractor performance, with respect to late deliveries and contractor default, been evident in cases in which COCs have been issued?
2. To what extent has poor contractor performance, with respect to late deliveries and contractor default, been evident in cases in which referrals to the SBA were made, but no COCs were issued?
3. Is there a significant difference in contractor performance under each of the two categories mentioned above?

Organization of the Study

The following chapter organization has been selected for the presentation of this study. Chapter II covers a background review of the SBA and its Certificate of Competency Program. Chapter III, Methodology, then discusses the methods chosen for identifying, selecting, and testing appropriate data in order to answer the research questions. Chapter IV presents the data collected and states the findings resulting from a statistical analysis of the data. Finally, Chapter V presents a summary of the research accomplished, describes the conclusions drawn from the findings, and offers recommendations for further research.

CHAPTER II

A REVIEW OF THE SBA AND ITS CERTIFICATE OF COMPETENCY PROGRAM

Importance of Small Business

A widely accepted view that underlies our economic and political system is that it is in the national interest of our society to have numerous, economically significant and effective small businesses. Only through the establishment of a large number of small businesses will our society be assured of maintaining the competition that is requisite of a free enterprise system (8:vi; 11:9).

The American principle of maintaining a society based upon the free enterprise system was felt to be of such importance that Congress, in writing the Small Business Act of 1953, stated:

The essence of the American economic system of private enterprise is free competition The preservation and expansion of such competition is basic not only to the economic well-being but to the security of this nation. Such security and well-being cannot be realized unless the actual and potential capacity of small business is encouraged and developed [16:232].

Section 3 of the Small Business Act goes on to provide a general definition of a small business as being "one which is independently owned and operated and which is not dominant in its field of operation [3:237]."

Today, approximately 97 percent of all businesses in the United States are classified as small businesses. These 10 million small businesses produce approximately 48 percent of the nation's gross national product and provide for about 55 percent of the private sector work force (11:4; 15:16).

Because small businesses provide such a substantial influence upon the American economic system, it is readily apparent that it should be in the national interest to preserve a strong, dynamic small business sector within the economy.

Government's Responsibility

Congress felt that what was needed to meet this objective was a government agency that would be active in promoting and protecting the interests of the small businessman (8:vii). An agency that would

. . . first, provide an organization to make small business concerns sound and self-sufficient Second, to insure the participation of small business enterprises in war, or mobilization of our economy for war, and for peace as well. Third, . . . to concentrate the responsibility for administering one program to preserve and develop small business in one independent agency of the Government [2:13].

By passing the Small Business Act of 1953, Congress established just such an agency, the Small Business Administration, and declared

. . . that the Government should aid, counsel, assist, and protect, . . . the interests of small business concerns in order to preserve free competitive enterprise, to insure that a fair proportion of the total purchases and contracts . . . for property and

services for the Government . . . be placed with small business enterprises . . . [16:232].

The overall mission with which the SBA was to concern itself in helping small business can be described as follows (2:167; 12:7):

1. To serve as a financial institution by making equity capital and general credit available to the small business enterprise system, either directly or in cooperation with banks and other lending institutions.

2. To assure that small businesses receive a fair and equitable share of the federal dollar spent on goods and services required in government operations.

3. To provide substantial indirect assistance to small businesses through its management and technical assistance programs and through its advocacy rule, by which it promotes interests of small businesses to assure their general welfare.

4. To assist members of socially and economically disadvantaged groups to achieve the same benefits from the American system that are available to those that represent the majority of the nation's population.

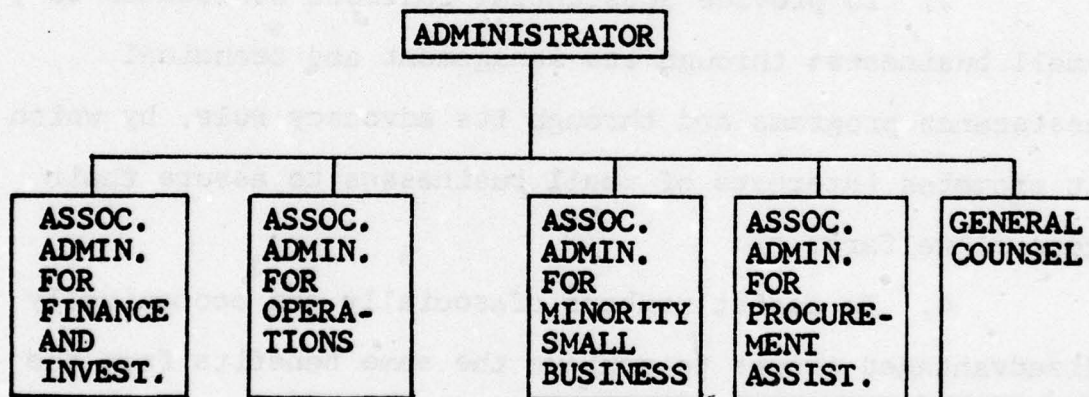
Organization of the SBA

The Small Business Administration is part of the Executive Branch of the U.S. Government. It is an independent agency whose management is vested in an

administrator appointed by the President with the advice and consent of the Senate (3:6).

As an agency, it is organized along three lines--its clientele, functions, and geography (8:81). The SBA, through a single administrator, acts as a direct voice to the President for its clientele, small business.

Internally, the SBA is functionally organized around its principal line functions of financial, investment, procurement, technical and management assistance, and minority small business assistance (Figure 1) (3:5; 7:625-630; 14:15).



ASSISTANT ADMINISTRATORS

Figure 1

SBA Headquarters Organization (14:15)

Through this type of organizational structure and its various programs, the SBA attempts to accomplish its

overall goal of aiding and protecting the interests of small business concerns. The Procurement Assistance Program is one such program the SBA has implemented in attempting to achieve this goal.

SBA Procurement Assistance Program

The U.S. Government is the largest single purchaser of goods and services in America (8:66). In 1972, a Federal Commission investigating government procurement estimated that government contracts for goods and services in Fiscal Year 1972 totaled approximately \$57.5 billion (12:348). By 1978, that market was estimated to be over \$70 billion (14:1).

Small businesses are often at a disadvantage in competing with larger firms. Several reasons for this are that smaller companies are limited in the size of contracts they can handle; they lack easy access to technical skills which a large company can obtain from its own staff; they are less able to digest all of the available information and keep up with technical advances; and their search for new markets is more confined than it would be if they had a larger sales force (15:36).

Because of these disadvantages, there was a general belief that small business was not receiving its fair share of Federal procurements. Congress also believed that a continuance of this inequitable situation would "lead to a

lessening of free competition, a further concentration of economic power, and a weakening of the private enterprise system [8:128]."

What the Federal Government needed was a purchasing policy which, on a national scale, would foster the maintenance of a strong, broad-based business enterprise system (10:12).

By strengthening the effectiveness of small business in ways that increase its independence from Government, we can make sure of the supremacy of American free enterprise in an economically troubled and regimented world [15:36].

The Small Business Administration was tasked by Congress, through Section 2 of the Small Business Act, to develop policies and procedures that would insure that small businesses received their fair share of government procurements. The method established by the SBA to carry out this responsibility led to the development of its Procurement Assistance Program.

Organization for Procurement Assistance

The organization for carrying out the policies and programs of the Procurement Assistance Program consists of a headquarters staff element under the SBA Associate Administrator for Procurement Assistance in Washington and field procurement assistance personnel assigned to the SBA regional field offices. A procurement assistance organization chart is shown in Figure 2.

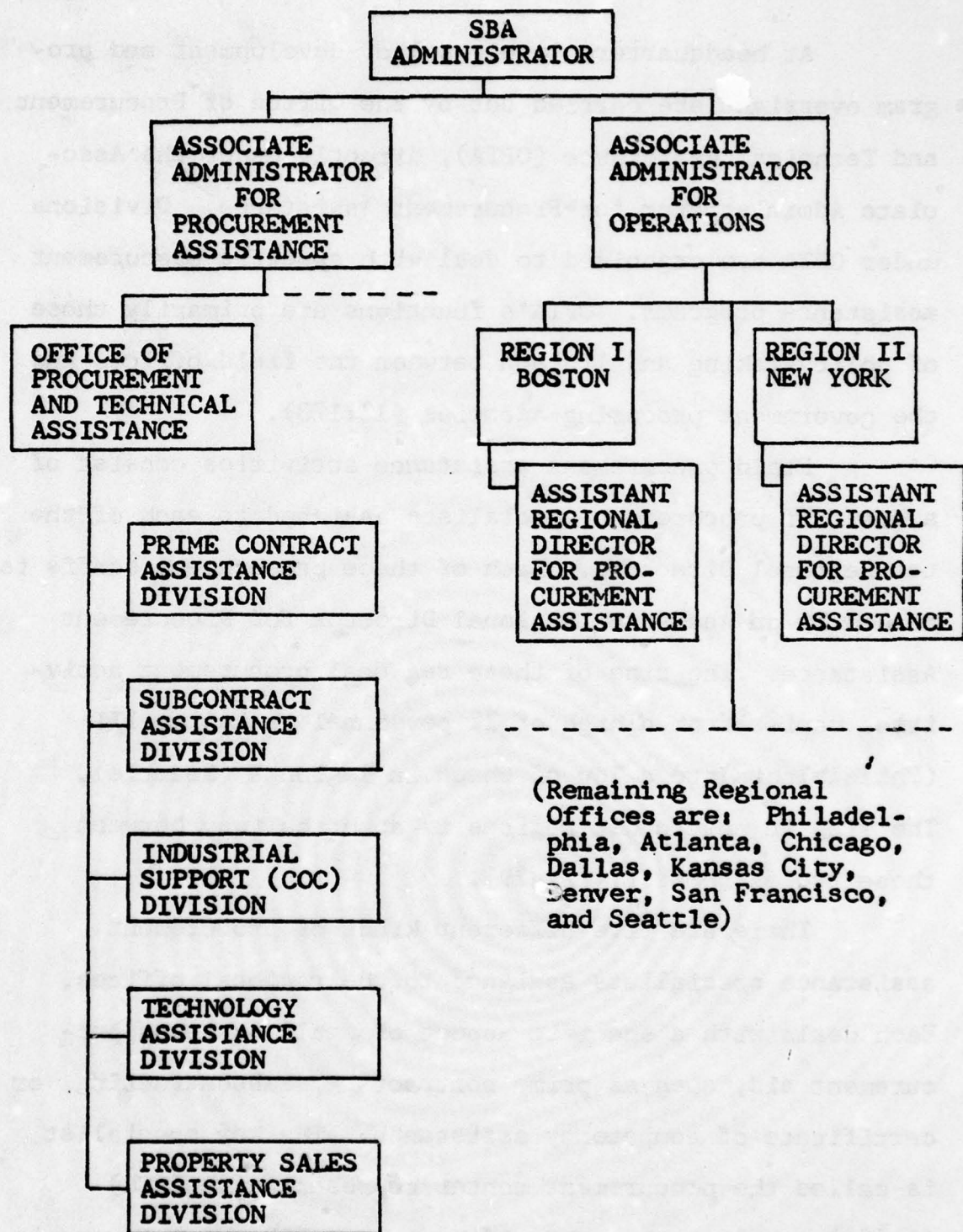


Figure 2

SBA Procurement Assistance Organization (14:16)

At headquarters level, policy development and program oversight are carried out by the Office of Procurement and Technical Assistance (OPTA), directly under the Associate Administrator for Procurement Assistance. Divisions under OPTA are organized to deal with specific procurement assistance programs. OPTA's functions are primarily those of policy-making and liaison between the field offices and the government procuring agencies (12:173).

Field procurement assistance activities consist of a staff of procurement specialists assigned to each of the ten Regional Directors. Each of these procurement staffs is headed by an Assistant Regional Director for Procurement Assistance. The size of these regional procurement activities varies from a high of 22 personnel in Region III (Philadelphia) to a low of three in Region X (Seattle). The size in most other regions is about halfway between these two extremes (14:21-29).

There are five different kinds of procurement assistance specialists assigned to the regional offices. Each deals with a specific aspect of small business procurement aid, such as prime contracting, subcontracting, or certificate of competency assistance. The key specialist is called the procurement center representative (PCR) (1:352). Unlike the other specialists, PCRs do not work in the regional field offices. Rather, they work at key Defense and Federal agency installations within the region.

PCRs perform the dual task of monitoring the procurement plans of the agencies at the installations to which they are assigned and seeking to increase small business participation in them, plus counseling area small business firms on ways in which they can effectively compete for these procurements (14:17).

Both the headquarters and field procurement assistance staffs are organized in terms of the specific programs designed to assist small business in securing government contracts. The major programs around which the Procurement Assistance Program is organized are: the Prime Contracts Program, the Subcontracts Program, the Technical Assistance Program, and the Certificate of Competency Program (13:14-15). The program upon which this study is focused is that of certificates of competency.

Certificate of Competency Program

The Certificate of Competency (COC) Program is one of the primary means through which the SBA helps small businesses obtain government contracts. It does this by allowing a small business firm the opportunity to appeal a decision by a government contracting officer that the firm, although it is low bidder on a contract, is not capable of performing the contract in a satisfactory manner.

Currently, the SBA is empowered by Section 8(b)(7) of the Small Business Act of 1953, 15 U.S.C. 637(b)(7):

(7)(A) To certify to Government procurement officers . . . with respect to all elements of responsibility, including, but not limited to, capability, competency, capacity, credit, integrity, perseverance, and tenacity, of any small business concern or group of such concerns to receive and perform a specific Government contract. A Government procurement officer . . . may not, for any reason specified in the preceding sentence, preclude any small business concern or group of such concerns from being awarded such contract without referring the matter for final disposition to the Administration [16:238].

The Act goes on to say that--

(7)(C) In any case in which the small business concern or group of such concerns has been certified by the Administration . . . to be a responsible or eligible Government contractor as to a specific Government contract, the officers of the Government having procurement . . . powers are directed to accept such certification as conclusive, and shall let such Government contract to such concern or group of concerns without requiring it to meet any other requirements of responsibility or eligibility [16:238].

The provisions of this portion of the Small Business Act of 1953 are set forth for Department of Defense components and agencies in the Armed Services Procurement Regulation (ASPR), Section 1-705.4. ASPR Section 1-705.4, Certificates of Competency, is divided into eight subsections, (a) through (h), each of which deals with a major aspect of the program.

Subsection (a) summarizes the main points of the Small Business Act provisions quoted above. It relates the SBA's authority to certify the competency of any small business with regard to ". . . capacity, credit, integrity, perseverance, and tenacity." It also relates the contracting officer's responsibility to accept the SBA's decision as

conclusive if the SBA certifies that the small business is competent to perform the contract, "unless the contracting officer has substantial doubt as to the concern's ability to perform [20:p.1:124]." Appeal procedures for these cases are outlined in later subsections.

Subsection (b) deals with the special case of those requirements for which the "highest competence available" or the "best scientific approach" are necessary, such as in some selected research and development or for highly technical products. The ASPR states that COC procedures need not be applied in these cases, except in the instance where the firm that is judged the most highly competent or judged to have the best scientific approach is denied contract award because it is determined to be nonresponsible. In these cases, the COC process does apply (20:p.1:124).

The basic procedures for the referral of a bid rejection to the SBA are covered in Subsection (c). First of all, if a Defense contracting officer determines that the low bidder on a particular contract is nonresponsible, the contracting officer must notify the appropriate SBA office (20:p.1:124).

There are 11 SBA offices around the country which are authorized to process COCs. These are comprised of the 10 SBA regional offices identified in Figure 2, plus the SBA district office in Los Angeles. Each of these 11 offices has a staff of COC specialists to process the cases (1:353).

Specific provisions regarding referrals to SBA include the following (20:p.1:124-6):

- a. The value of the contract must exceed \$10,000.
- b. The decision by the contracting officer that the low bidder is nonresponsible must be based on the results of a pre-award survey.
- c. The contracting officer cannot make a concurrent referral of two or more bids on the same contract. The SBA must make a final decision on the first referral before a second can be investigated. If, of course, the first bidder referred to the SBA is certified as competent to perform the contract, the contract must be awarded to that bidder.
- d. The SBA office which is processing the case must make its decision on the competency of the firm within 15 working days after the referral is made. It should be noted here that if the decision on issuance of a COC is negative, the regional office processing the case will so inform the contracting officer. If the decision is made to issue a COC, and the value of the contract does not exceed \$500,000, the COC can be issued by the regional office director. If, however, the decision is affirmative and the contract value exceeds \$500,000, the matter must be referred to the SBA headquarters office in Washington, D.C. for final approval. This approval rests with the SBA Associate Administrator for Procurement Assistance (1:354).

e. A referral cannot be made to the SBA until all bids have been evaluated by the contracting officer.

f. After referring a case to an appropriate SBA office, the contracting officer must maintain close contact with that office to insure that the SBA is taking action on the matter.

g. The contracting officer need not refer a case to the SBA if he certifies in writing that the urgency of the procurement is such that the SBA decision process on certification of competency would preclude the timely purchase of the contract items.*

h. If the contracting officer determines that a low bidder is nonresponsible and refers the case to the SBA, he must be able to support his decision by "substantial evidence documented in the contract files."

Subsection (d) outlines DoD's desire to maintain a cooperative working arrangement with the SBA regarding COC matters. To assist in reaching an agreement with the SBA on each referral, the contracting officer must furnish certain documentation to the SBA office processing the case.

*A Hq USAF/RDC message, 292100Z AUG 78, to all Air Force major commands, pointed out the Comptroller General's concern over whether or not the urgency exception was in conflict with the Small Business Act's direction that all cases involving the determination of nonresponsibility for small business concerns be referred to the SBA. As a result of this concern, the message directed the major commands to refer all cases to the SBA and not apply the urgency exception.

This documentation includes copies of the solicitation for bids, drawings and specifications of the required items, the pre-award survey findings, and any other information which was pertinent to the contracting officer's decision that the low-bidding firm was nonresponsible for performing the contract (20:p.1:127).

If the SBA plans to certify the competency of a small business judged nonresponsible by a Defense contracting officer, it must provide the reasons, in writing, to the contracting officer and allow him an opportunity to present new or additional information on the case before the final decision is made. These provisions are detailed in Subsection (e). The ASPR here states that "every effort should be made to resolve any differences between the SBA and the Departments through a complete exchange of pre-award information developed by each agency [20:p.1:127]."

Subsection (f) relates the possible courses of action that can occur following the exchange of information under Subsection (e). These are that (20:p.1:127-9):

a. The new and additional facts provided by the SBA are sufficient to persuade the contracting officer that his decision that the low bidder was nonresponsible should be reversed and the referral to the SBA should be withdrawn. In these cases, the contract will be awarded without the issuance of a COC.

b. The SBA regional office and the Defense contracting officer cannot agree and the contracting officer still has serious doubts about the low bidder's capability to perform. In this case, the contracting officer can request that the SBA regional office curtail action and forward the case to Washington, D.C., for review by SBA headquarters.

(1) At the headquarters, the case is reviewed by the Central Office COC Review Committee, which is comprised of legal, financial, and technical experts, and a recommendation is made to the Associate Administrator for Procurement Assistance (1.354).

(2) Prior to presentation to SBA headquarters, however, the Service involved will provide all documentation for review by DoD officials at the Assistant Secretary or Director, Defense Logistics Agency, level. This review may result in a decision to make the award and not forward the matter to SBA headquarters. In this case, the SBA regional office will be informed that the contract is being awarded and a COC will not be required.

(3) If the case goes to the SBA Associate Administrator for Procurement Assistance and his final decision is to issue a COC, the contract will then be awarded to the firm without any further requirements of responsibility being placed against the firm. In other words, the Associate Administrator's decision is the final word.

c. The contracting officer and the SBA regional office do not reach agreement, but the contracting officer feels "it would not be practicable to appeal the case . . . nor would it be appropriate to withdraw . . ." the referral to the SBA. In this case, the contracting officer tells the SBA regional office that a COC must be issued before the contract will be awarded to the low bidder.

Subsection (g) states that if the SBA regional office issues a COC without first giving the contracting office a chance to appeal to a higher level, the contracting officer has the right to appeal, as in Subsection (f), above, after the formal issuance of a COC, if he still has doubts about the competency of the firm to satisfy the contract (20:p.1:129).

Finally, Subsection (h) discusses the case of the SBA making a decision on COC issuance on the basis of some standard other than that which was used in the contracting officer's decision to refer the case to the SBA. If the SBA declines to issue a COC based on a different standard, it must notify the contracting officer of the fact and the reason for its decision to do so. The contracting officer can then use this information in deciding on the contract award.

Summary

It is widely accepted that the maintenance of a strong and viable small business sector in our economy is

vital to our national interest. Congress expressed this view in passing the Small Business Act of 1953. The Act created the Small Business Administration, whose overall goal is to actively promote and protect the interests of small business. One of the primary objectives of the SBA is to assure that small businesses receive a fair and equitable share of government contracts.

The SBA's Procurement Assistance Program is designed to help insure that small businesses receive their fair share of these government contracts. One of the primary subprograms used by the SBA to meet this objective is the Certificate of Competency (COC) Program. The COC Program does this by giving a small business concern the opportunity to reverse a decision by a government contracting officer that the concern is not competent to complete a particular contract.

The primary provisions of the program, which are detailed for Defense components and agencies in the Armed Services Procurement Regulation, Section 1-705.4, are

- (1) that any small business which is low bidder on a contract and is determined by the contracting officer to be nonresponsible may appeal the decision to the SBA; and
- (2) that if the SBA rules that the firm is capable of completing the contract, the contract must be awarded to the firm.

The following chapter will present the methodology used to answer the research questions posed in this study.

CHAPTER III

METHODOLOGY

This chapter describes the universe, population, and sample for this study; presents the data collection plan; and states the statistical tests to be employed in evaluating the findings.

Universe Description

The universe under consideration in this study consists of all contract proposals referred to the SBA for COC action by Air Force contracting officers. During Fiscal Years 1977 and 1978, a total of 286 referrals were made by Air Force contracting officers to the SBA (Table 1).

Population and Sample

Description. The population under consideration was limited to contract proposals referred to the SBA for COC action by AFLC's five Air Logistics Centers.

In order to answer the research questions, the population of contract referrals within AFLC was separated into two sub-population groups. Contracts awarded as a result of COC issuance comprised one group. Those contract proposals referred to the SBA for COC action, but which were awarded without issuance of a COC, comprised the second

Table 1

Contract Proposals Referred to the SBA for COC Action
During FY 77-78--A Breakdown by Commands

Command	FY 77	FY 78
AU	0	0
AAC	0	0
ADCOM	1	0
ATC	3	8
MAC	9	7
SAC	9	9
TAC	1	6
AFCS	2	0
AFLC	90	122
AFSC	9	8
AFAFC	0	0
AFRES	0	0
USAFA	0	1
USAFSS	0	0
PACAF	0	1
USAFE	0	0
TOTALS	124	162

Source: Certificate of Competency Report, RCS:
DD-I & L (Q) 1152 HQ USAF/RDC, Washington, D.C.

group. In other words, the second sub-population group consisted of cases in which the lowest bidder either declined to file for a COC, withdrew his request for a COC once an investigation for COC issuance had been initiated, or had been declined issuance of a COC by the SBA. As a result, the contract was awarded to the second lowest bidder who, for inclusion in the second sub-population group, was determined by the contracting officer to be sufficiently competent to perform the contract without COC action.

An initial survey conducted at HQ AFLC indicated that 275 referrals were made to the SBA from FY 76 through FY 78. Of these 275 referrals, 70 contracts were awarded after issuance of a COC, 10 contracts were cancelled, and 24 were unresolved, resulting in 171 contracts being awarded without issuance of a COC.

Of the 70 contracts awarded after issuance of a COC, 5 were service contracts, for such things as janitorial service or food service, and were not included in the first sub-population group. As a result, only 65 contracts awarded under COCs were considered in the study. Similarly, 11 of the 171 contracts awarded without issuance of a COC were service contracts. Therefore, only 160 contracts awarded without issuance of a COC were included in the second sub-population group. The reason these service contracts were excluded from the population is that they were

awarded to satisfy base-level requirements and were not central procurement contracts issued by the ALCs.

In consideration of the small number of contracts awarded under issuance of a COC, no sample was taken from this sub-population group. Instead, a census measuring the parameters of this sub-population group was utilized.

However, sampling procedures were utilized for the second sub-population group. This procedure consisted of taking a random sample from the remaining 160 contracts that were awarded without issuance of a COC. Statistics were then computed from this sample and utilized in estimating parameters of the second sub-population group.

Justification. As mentioned in Chapter I, over one-third of the Air Force total awards to small business were made by AFLC's five Air Logistics Centers. It can be shown, from Table 1, that the number of referrals made by AFLC during FY 77 and 78 represented, on the average, over 75 percent of the total referrals made by all commands within the USAF. Because of the magnitude in number of referrals made and the diversity in types of contracts performed within AFLC, it was assumed that contract referrals within AFLC are representative of referrals made by other commands. This assumption is necessary in case inferences are made beyond the population to the universe.

Data Collection

Independent variables. The data for the two independent variables, contracts awarded under issuance of a COC and contracts referred to the SBA for COC action, but which were awarded without issuance of a COC, were obtained from copies of HQ AFLC's reports to HQ USAF under DD-I & L (Q) 1152, Certificate of Competency Report.

The Certificate of Competency Report is required by the ASPR, Section 1-705.4(c)(iii), which stipulates that each Service will submit a quarterly report to DoD on individual cases referred to the SBA for COC determination. For each case, the report must give the name of the contractor, a short description of the item or service being contracted for, the solicitation number, the dollar value of the resultant contract, the date of referral to the SBA, and the final disposition of the case. Each Air Force major command is required to submit a report of individual cases within the command to the Directorate of Contracting and Acquisition Policy, HQ USAF, where the information is consolidated into the Air Force report to DoD (18:1-17).

As mentioned earlier, the number of contracts awarded under issuance of a COC was relatively small. Therefore, the information required for this independent variable was obtained through a census.

The specific contracts comprising the second independent variable were obtained from a sampling process.

The sampling process utilized was that of random sampling and was conducted in the following manner.

The solicitation numbers of contracts referred to the SBA for COC action, but which were awarded without issuance of a COC, were obtained from the Certificate of Competency Reports from each ALC. These solicitation numbers were then assigned a unique reference number and pooled together to form one group. A sample was then selected using a random entry into a table of random numbers. This sample was then utilized as the basis for computing statistics concerning contracts awarded without issuance of a COC.

The determination of the appropriate sample size utilized in computing the necessary statistics was an important part of the sampling process. The researchers determined the appropriate sample size by utilizing the formula (4:148-153):

$$\sigma_p = \sqrt{\frac{P(1-P)}{n} \cdot \frac{N-n}{N-1}}$$

The data utilized in calculating the sample size were as follows:

± 0.10 = sampling error or the difference between the results obtained from a sample statistic and the result which would have been obtained from the population parameter (9:300). In other words, this is the desired interval range within which the population proportion, π , was expected to

lie (4:151). This range was arbitrarily set by the researchers.

$1.96 \sigma_p$ = 95 percent confidence level for estimating the interval within which the population proportion, π , could be expected to lie (4:151). This confidence level was arbitrarily established by the researchers.

σ_p = the standard error of the proportion, computed from the sample (4:151; 9:300).

$$\sigma_p = \frac{.10}{1.96} = .051$$

$P(1-P)$ = measure of sample dispersion where P equals the sample proportion. Since no information had been obtained concerning the probable P value, the researchers set P equal to .5 in order to establish a maximum sample size (4:151; 9:345).

$\frac{N-n}{N-1}$ = finite correction factor where N = population size and n = sample size. Utilized when the ratio of the sample size to the population size exceeds 5 percent (9:320). For the purposes of this research, N was determined to equal 160.

Using the data given, the maximum sample size required was calculated to be,

$$\sigma_p = \sqrt{\frac{P(1-P)}{n} \cdot \frac{N-n}{N-1}} = 0.051 = \sqrt{\frac{.5(1-.5)}{n} \cdot \frac{160-n}{160-1}}$$
$$n = 60.281 \approx \underline{\underline{61}}$$

Dependent variables. The two variables chosen to measure contractor performance were contract delivery delinquencies and the initiation of termination for default proceedings. Delinquent delivery was chosen because the researchers felt

that it was the best single measure of contractor performance. The reason is that a wide range of contractor problems, such as quality, financial or management deficiencies, are manifested in the delivery performance of the contractor. The initiation of default proceedings was felt to be a good measure of the severity of the problems being experienced by the contractor in fulfilling the terms of the contract.

To collect data on the two dependent variables, it was necessary to have, for each contract, both the contract number and the name of the company to which the contract was issued. The ASPR reporting instructions for the quarterly COC reports require only that the initial solicitation number and the name of the low bidder referred to the SBA be included in the report. Thus, if the referral resulted in an award of a COC to the company, the available information consisted of the solicitation number and the name of the company which received the contract. If a COC was not issued and the contract went to the next lowest bidder, the only information available was the original solicitation number. Therefore, in order to track the contractor performance results, it was necessary to convert all solicitation numbers to contract numbers and, in the cases where COCs were not issued, to locate the name of the company which received the contract award.

To find the required information, assistance was requested from the ALCs. A letter was sent to each ALC Small Business Representative, under the signature of the HQ AFLC Executive for Small Business, Mr. Robert B. Kennedy. The letter asked that each addressee provide the contract number corresponding to each solicitation number and, where necessary, the name of the company receiving the contract. A copy of the letter is at Appendix A.

While the information on the contract numbers and contractor names was being collected, an examination of the possible sources of contractor performance information was made. Initially, four possible sources of data on contractor defaults and late deliveries had been identified. These were the AFLC J041 Acquisition and Due-In System (ADIS); the Contractor Responsibility Review Program (CRRP) files maintained at the ALCs; the individual contract files, also kept at the ALCs; and the contractor performance files maintained by the Defense Contract Administration Service (DCAS) offices responsible for administering the contracts.

A major portion of J041 ADIS reporting is the maintenance of data related to procurement documents. The production status reporting portion of ADIS is used to identify and track all active ALC-awarded central procurement contracts. As an aid to management use of the output of this system, "contractors' production performance history is established and maintained locally within J041 for each

contractor having been awarded a contract by the ALC [17:1-1]." This data source was preferred, since the information in the J041 system could be accessed at AFLC Headquarters at Wright-Patterson AFB. The J041 data products were examined to see if the contractor performance data captured in the system contained the specific data elements necessary to establish whether or not contractor default or late delivery occurred in each of the contracts being examined. Unfortunately, this data source proved to be unacceptable when it was found that delivery information was recorded in the system by contractor name and contract line item number only. The system provided no way to readily relate performance data to a specific contract.

The second potential data source, the CRRP files, is maintained at each ALC. A separate file is maintained for each company from which the ALC purchases central procurement items. The files are designed to provide performance data on specific contractors to enable contracting officers to determine more accurately the responsibility of prospective contractors (19:1). According to the implementing directive for the CRRP program, each file is to contain such contractor performance indicators "as contract delivery delinquencies, . . . default terminations [19:1]." As with the J041 system, however, this source of data proved to be inadequate. A review of the CRRP files maintained at one ALC revealed that, as with the J041,

performance information was not maintained with respect to individual contract numbers. Additionally, in many cases, information was not maintained for longer than the previous six months.

The two remaining sources of information, the contract files maintained at the ALCs and the contractor performance files maintained by the DCAS contract administration offices, were found to be adequate for obtaining the required data.

As the initial step in obtaining performance data from the contract files at the ALCs, the researchers visited San Antonio ALC in San Antonio, Texas. There was a twofold purpose in the visit. First, since more contracts under study were awarded by San Antonio ALC than by any other single ALC, it was felt that if the researchers performed the data search there it would significantly ease the data collection burden on the ALCs. Second, it was felt that the knowledge gained from a personal review of the contract files at one ALC would aid in formulating the questions asked of the other ALCs. After the performance data were gathered at San Antonio ALC, a letter was sent to each of the other ALCs requesting that the following questions be answered for each contract identified.

1. Did the contractor deliver the product in accordance with the scheduled delivery dates/shipping instruction specified in the original contract?

2. If the answer to Question 1 is "No," was the late delivery the fault of the contractor or the Government?

3. What was the extent of the late delivery?

4. Were termination for default proceedings initiated for this contract?

A copy of the letter sent to the ALCs is at Appendix B.

The contractor performance files maintained by DCAS are kept at the DCAS Management Area (DCASMA) office within each region which actually administered the particular contract. One of the key records kept in each file is the Production Schedule Completion Record (PSCR). This ADP report is maintained by contractor and contains performance information on every contract that the contractor completes within each monthly reporting period. The monthly reports are summarized in quarterly reports and these quarterly reports are normally maintained for a period of one year (21:88). The information contained in these reports includes, by contract, whether or not the contract was completed on schedule and, if not, the reason for delay, the length of delay, and whether or not termination for default was made. To collect information from this source, the contracts were grouped by the DCASMA to which the individual contractors were assigned. Then, each DCASMA was queried by telephone for performance information on the specific contracts pertaining to that office.

The fact that the information requested from the ALC contract files and the DCASMA contractor performance files was essentially the same may make it appear that duplication of effort occurred in the data collection. There was, however, a reason for using both sources. Since the DCASMA information is generally not maintained for more than one year, it was felt that the ALC contract files would be the best source of information on the older contracts. On the other hand, the DCASMA offices, being responsible for actual contract administration, were likely to have the most current information on the more recent contracts. For those contracts on which we received data from both sources, the duplication of information provided a good cross-check to examine the reporting consistency of the information sources. In these cases, the information received was found to be virtually identical.

Answering the Research Questions

The research questions to be answered are restated as follows:

1. To what extent has poor contractor performance, with respect to late deliveries and contractor default, been evident in cases in which COCs have been issued?
2. To what extent has poor contractor performance, with respect to late deliveries and contractor default, been evident in cases in which referrals to the SBA were made, but no COCs were issued?

3. Is there a significant difference in contractor performance under each of the two categories mentioned above?

Research questions 1 and 2 were answered directly based on information obtained from the five ALCs and the DCAS contract administration offices. Research question 3 was answered by testing the following hypotheses:

A. There is no significant difference between the proportion of late deliveries among contracts performed under issuance of a COC as compared to the proportion of late deliveries among contracts performed without issuance of a COC.

B. There is no significant difference between the proportion of contractor defaults among contracts performed under issuance of a COC as compared to the proportion of contractor defaults among contracts performed without issuance of a COC.

The questions analyzed were whether the differences between the two computed proportions were statistically discernible. That is, assuming that the data were sufficient to allow only a small sampling error, was there a statistically discernible difference between contracts performed under a COC and those contracts performed without issuance of a COC?

The measurement scale (data level) of the independent random variable was nominal, and its classification

category (value level) was discrete dichotomous. That is to say, the independent random variable selected was classified as either contracts awarded under issuance of a COC or contracts awarded without issuance of a COC.

The measurement scale and classification category of the dependent random variables were also nominal and dichotomous, respectively. That is, the contractor's performance was either satisfactory or unsatisfactory. In terms of delivery schedule, the delivery was either on-time (satisfactory) or late (unsatisfactory). Contractor performance in terms of default, for the purposes of this research, signified whether or not the performance under the terms of the contract was of such nature that the Air Force initiated termination for default proceedings against the contractor.

Classifying the dependent variables in this manner lent itself to the use of proportions as an aid in performing statistical tests on the data. Proportions are nothing more than disguised averages of 0-1 variables where 0 and 1 represent satisfactory and unsatisfactory performance, respectively. As disguised averages of 0-1 variables, proportions can be handled easily with the general theory of sampling and utilized in the computation of confidence intervals for purposes of testing hypotheses (22:166-170, 223).

Unless otherwise specifically noted, the remainder of this chapter consolidates any reference to the two dependent variables, late deliveries and contractor default, into a single dependent variable--contractor performance--for reasons of brevity in explaining the statistical test that was utilized.

As mentioned earlier, a census was taken of the contracts awarded under issuance of a COC. As a result, the proportion of contracts performed unsatisfactorily within this group represents a parameter of this sub-population and is labeled π .

The proportion of contracts performed unsatisfactorily with the second sub-population group, contracts awarded without a COC, was computed from a sample of that group. This proportion, labeled P , is a statistic since it describes a characteristic of a sample instead of a population (9,299).

As previously noted, the hypothesis that was tested in answering research question 3 was that there is no significant difference between the proportion of late deliveries/contractor defaults among contracts performed under issuance of a COC as compared to the proportion of late deliveries/contractor defaults among contracts performed without issuance of a COC. In other words,

$$H_0: \pi \text{ with COC} - P \text{ without COC} = 0$$

$$H_1: \pi \text{ with COC} - P \text{ without COC} \neq 0$$

The test of the null hypothesis was conducted by constructing a confidence interval around P to see if it included π (22:243). The construction of this confidence interval was accomplished by the use of the following formula (9:340; 22:223):

$$\pi = P \pm t_{.025} \sqrt{\frac{P(1-P)}{n} \cdot \frac{N-n}{N-1}}$$

where

π = proportion of contracts performed unsatisfactorily within the sub-population group--contracts with COC. Parameter computed from a census.

P = proportion of contracts performed unsatisfactorily within a sample from the sub-population group--contracts without COC. Statistic computed from a sample.

$t_{.025}$ = critical value leaving $2\frac{1}{2}$ percent of the probability in the upper tail. Based on a 5 percent significance level arbitrarily established by the researchers. $t_{.025}$ is utilized instead of $Z_{.025}$ since sample size is only moderately large (22:224).

$\frac{N-n}{N-1}$ = finite correction factor for finite populations, where N = population size and n = sample size. Utilized when the ratio of the sample size to the population size exceeds 5 percent (9:320). For the purposes of this research, the population size was 160 and the expected sample size was 61.

$\frac{61}{160} = .381$, which is obviously greater than .05.

Once the confidence interval was constructed, it was used immediately to test the null hypothesis. If the parameter π was found to lie outside the confidence interval

established around the statistic P, then the null hypothesis would be rejected. That is to say, there is a statistical difference in contractor performance between contracts performed under issuance of a COC as compared to those contracts performed without issuance of a COC.

A Summary List of Assumptions

1. Contract referrals within AFLC are representative of referrals made by other Air Force commands. This assumption is necessary in case inferences are made beyond the population to the universe.

2. The time period covered by this research is of sufficient duration to provide valid test results.

3. The administration of contracts awarded under issuance of a COC is not significantly different than the administration of contracts awarded without issuance of a COC, with respect to insuring on-time deliveries.

4. The data loss which occurs during data collection and analysis does not bias the results of the tests performed.

A Summary List of Limitations

1. This study does not analyze causes of poor contractor performance, but only determines whether it was present.

2. This study does not address the criteria used to justify referral of a low bidder to the SBA, nor does it

examine the criteria used by the SBA to determine qualification for COC issuance.

3. The conclusions of this research apply only to central procurement contracts issued by the Air Logistics Centers.

The next chapter covers data presentation, analysis, and findings.

CHAPTER IV

DATA PRESENTATION, ANALYSIS, AND FINDINGS

This chapter presents the data collected and states the findings resulting from statistical analysis of the data.

Data Presentation and Analysis

As mentioned in Chapter III, Methodology, the initial data for this research project were obtained from copies of HQ AFLC reports to HQ USAF under DD-I & L (Q) 1152, Certificate of Competency Report. A detailed summary of this data is presented in Table 2. As shown in Table 2, the resulting sub-population groups utilized for this research project consisted of 65 contracts awarded under issuance of a COC and 160 contracts awarded without issuance of a COC.

The overall distribution of each sub-population group, by ALC and fiscal year, is given in Table 3a. Tables 3b and 3c summarize these data into frequency distributions within and among fiscal years, respectively. The data contained in these tables indicate that the percentage of contracts awarded under issuance of a COC, as compared to the percentage of those contracts awarded without issuance of a COC, has declined since Fiscal Year 1976.

Table 2
Summary of Initial Data Collected

	San Antonio (SA-ALC)	Sacramento (SM-ALC)	Oklahoma City (OC-ALC)	Ogden (OO-ALC)	Warner- Robins (WR-ALC)	Total
Referred to SBA	87	40	73	42	33	275
Allocation to Sub-population Groups	Non- COC	Non- COC	Non- COC	Non- COC	Non- COC	Non- COC
	26 61	10 30	14 59	9 33	11 22	70 205
Excluded ¹	2 6	2 5	1 24	Ø 9	Ø 1	5 45
Sub-populations Utilized	24 55	8 25	13 35	9 24	11 21	65 160
Percent Within ALC	30.4 69.6	24.2 75.3	27.1 72.9	27.3 72.7	34.4 65.6	28.9 71.1

¹As indicated in Chapter III, excluded data consist of service-type contracts, cancelled purchase requests, and solicitations which were referred to the SBA for COC action but which were pending at the time of data collection.

Table 3a

Distribution of Sub-population Groups
by ALC and Fiscal Year

Sub-population Group	ALC	FY 76	FY 77	FY 78	Total	
COC	SA-ALC	11	2	4	7	24
	SM-ALC	5	1	0	2	8
	OC-ALC	6	1	1	5	13
	OO-ALC	1	2	4	2	9
	WR-ALC	6	2	2	1	11
	Total	29	8	11	17	65
Non-COC	SA-ALC	20	2	10	23	55
	SM-ALC	7	0	9	9	25
	OC-ALC	5	2	10	18	35
	OO-ALC	9	4	2	9	24
	WR-ALC	7	1	7	6	21
	Total	48	9	38	65	160
Combined	SA-ALC	31	4	14	30	79
	SM-ALC	12	1	9	11	33
	OC-ALC	11	3	11	23	48
	OO-ALC	10	6	6	11	33
	WR-ALC	13	3	9	7	32
	Total	77	17	49	82	225

Table 3b

Frequency Distribution of Sub-population Groups Within Fiscal Years

Sub-population Group	FY 76 Number	FY 76 %	FY 7T Number	FY 7T %	FY 77 Number	FY 77 %	FY 78 Number	FY 78 %	Total Number
COC	29	37.7	8	47.0	11	22.4	17	20.7	65
Non-COC	48	62.3	9	53.0	38	77.6	65	79.3	160
Total	77	100	17	100	49	100	82	100	225

Table 3c

Frequency Distribution of Sub-population Groups Among Fiscal Years

Sub-population Group	FY 76 Number	FY 76 %	FY 7T Number	FY 7T %	FY 77 Number	FY 77 %	FY 78 Number	FY 78 %	Total Number
COC	29	44.6	8	12.3	11	16.9	17	26.2	65
Non-COC	48	30.0	9	5.6	38	23.3	65	40.6	160
Combined	77	34.2	17	7.6	49	21.8	82	36.4	225

A detailed analysis of this apparent trend was considered beyond the scope of this research project; therefore, these data are presented for informational purposes only.

Other data initially collected from the quarterly Certificate of Competency Reports are contained in Table 4a. This table displays the overall distribution of each sub-population group by ALC and contract dollar value. The data in Table 4a were then summarized into frequency distributions of sub-population groups within and among contract dollar value categories and are presented in Tables 4b and 4c, respectively.

Table 4c indicates that the majority of contracts awarded within each sub-population group was distributed among the lower dollar value categories (i.e., less than \$100,000). Table 4b indicates that as the dollar value of the contract increased (up to \$1,000,000) the percentage of contracts awarded under issuance of a COC increased, as compared to the percentage of contracts awarded without issuance of a COC.

Again, these data are presented for informational purposes only, as the researchers considered an in-depth analysis to be beyond the specific objectives of this study.

In order to complete the objectives of this study, an attempt was made to collect performance data on specific contracts within each sub-population group. As explained

Table 4a
Distribution of Sub-population Groups by ALC and Contract Dollar Value

Sub-population Group	ALC	\$10,000-49,999	\$50,000-99,999	\$100,000-499,999	\$500,000-999,999	Over \$1,000,000	Total
COC	SA-ALC	10	4	6	3	1	24
	SM-ALC	3	1	4	0	0	8
	OC-ALC	6	3	2	2	0	13
	OO-ALC	4	3	2	0	0	9
	WR-ALC	6	2	3	0	0	11
	Total	29	13	17	5	1	65
Non-COC	SA-ALC	28	9	14	1	3	55
	SM-ALC	12	3	6	0	4	25
	OC-ALC	24	4	6	1	0	35
	OO-ALC	16	5	2	0	1	24
	WR-ALC	13	3	2	1	2	21
	Total	93	24	30	3	10	160
Combined	SA-ALC	38	13	20	4	4	79
	SM-ALC	15	4	10	0	4	33
	OC-ALC	30	7	8	3	0	48
	OO-ALC	20	3	4	0	1	33
	WR-ALC	19	5	5	1	2	32
	Total	122	37	47	8	11	225

Table 4b
Frequency Distribution of Sub-population Groups
Within Contract Dollar Value Categories

Sub- population Group	\$10,000- 49,999		\$50,000- 99,999		\$100,000- 499,999		\$500,000- 999,999		Over \$1,000,000		Total
	Number	%	Number	%	Number	%	Number	%	Number	%	
COC	29	23.8	13	35.1	17	36.2	5	62.5	1	9.1	65
Non-COC	93	76.2	24	64.9	30	63.8	3	37.5	10	90.9	160
Total	122	100	37	100	47	100	8	100	11	100	225

Table 4c
Frequency Distribution of Sub-population Groups
Among Contract Dollar Value Categories

Sub- population Group	\$10,000- 49,999		\$50,000- 99,999		\$100,000- 499,999		\$500,000- 999,999		Over \$1,000,000		Total
	Number	%	Number	%	Number	%	Number	%	Number	%	
COC	29	44.6	13	20.0	17	26.2	5	7.7	1	1.5	65
Non-COC	93	58.1	24	15.0	30	18.8	3	1.9	10	6.2	160
Combined	122	54.2	37	16.4	47	20.9	8	3.6	11	4.9	225

in Chapter III, a census totaling 65 contracts was taken from the sub-population group consisting of contracts awarded under issuance of a COC. From this group, complete information was collected for 46 contracts providing a data yield rate of 70.8 percent.

From the 160 contracts comprising the second sub-population group, contracts awarded without issuance of a COC, a random sample of 61 contracts was selected. Complete information was obtained for 44 contracts from this sample, providing a 72.1 percent data yield rate.

The reduction in the number of contracts for which complete information was collected was due to one or more of the following reasons:

1. The inability to convert solicitation numbers of older contracts into contract numbers.
2. The purchase request being cancelled after a contract had been referred to the SBA.
3. The inability to locate records on selected contracts.
4. Delivery requirements of later contracts being not yet due, i.e., current contracts.

A summary of this information is presented in Table 5, Results of Contract Information Requests.

Earlier calculations (Chapter III) utilizing the formula for computing maximum required sample size (4:148-153),

Table 5
Results of Contract Information Requests

Sub- population Group	No. in Sub- population	No. of Contracts On Which Info. Was Requested	Reasons and Number of Con- tracts On Which Information Was Not Received				Number of Contracts On Which Informa- tion Was Received	
			Con- version Problems	Req. Canc.	Unable to Locate	Deliv. Not Yet Due	Contracts with Complete Data	Percent of # Requested
COC	65	65	12	2	3	2	46	70.8
Non-COC	160	61	10	1	3	3	44	72.1
Total	225	126	22	3	6	5	90	71.4

$$\sigma_p = \sqrt{\frac{P(1-P)}{n} \cdot \frac{N-n}{N-1}}$$

where

$$\sigma_p = \frac{\text{Sampling Error } (0.10)}{\text{Desired Confidence Level } (1.96)}$$

indicated that a sample size of 61 would provide for a maximum sampling error of ± 10 percent. Working with a sample size of 44 contracts for which complete information was collected, the researchers calculated the revised maximum sampling error to be

$$\frac{\text{Sampling Error (SE)}}{1.96} = \sqrt{\frac{.5(1-.5)}{44} \cdot \frac{160-44}{159}}$$

$$\text{Sampling Error (SE)} = .126 \text{ or } \pm \underline{\underline{12.6\%}}.$$

Since this percentage represented the maximum sampling error that could be expected, the researchers felt that the slight increase of 2.6 percent was acceptable.

As a result of the time constraint involved in completing this study and the feeling that the smaller sample was still an unbiased representation of its sub-population group, no additional random samples were taken. The researchers therefore concentrated their effort toward the analysis of the resulting contract information collected.

In analyzing the delivery performance data of selected contracts from each sub-population group, it was discovered that four contracts from each group were delinquent as the result of government-caused delays. Since the

individual contractor's delivery performance could not be determined on these contracts, they were subsequently excluded from further analysis. This action essentially reduced the number of COC and non-COC contracts usable for analysis to 42 and 40 contracts, respectively.

Of the 42 contracts awarded under issuance of a COC, 23 encountered delivery delays resulting in a delinquency rate of 54.8 percent. The delinquency rate for the 40 contracts awarded without issuance of a COC was found to be higher at 62.5 percent. This information is summarized in Table 6, Delivery Performance for Contracts Included in Study.

Because the number of non-COC contracts usable for analysis had been reduced from 44 to 40, the researchers felt that a recalculation of possible sampling error was in order. Following the procedures described above, but using the actual delinquency rate encountered, the researchers calculated the maximum sampling error that could be expected to be,

$$\frac{SE}{1.96} = \sqrt{\frac{.625(1-.625)}{40} \cdot \frac{160-40}{160-1}}$$
$$SE = .1303 \text{ or } \underline{13.0\%}.$$

Since this sampling error represented only a 0.4 percent increase from the maximum sampling error which could be expected from a sample of 44 contracts, or 3.0 percent

Table 6
Delivery Performance for Contracts Included in Study

	Number of Contracts With Complete Data	Contracts With Government- Caused Delinquencies	Number of Contracts Usable for Analysis	Number on Schedule	Number Delinquent	Percent Delinquent
COC	46	4	42	19	23	54.8
Non-COC	44	4	40	15	25	62.5

increase from the original sample of 61 contracts, the researchers felt that this sampling error was acceptable and would not significantly bias the overall results.

One by-product of obtaining data on delivery performance was that of receiving information on the length of delays encountered among the delinquent contracts. This information is summarized in Table 7. It can be seen from the information presented in Table 7 that of the contracts which were awarded under issuance of a COC, the percentage which was delinquent for 60 days or more was 8.6 percent higher than the same category of contracts awarded without issuance of a COC. This difference in percentages is discussed in Chapter V.

Table 7
Duration of Delays

		<u>Length of Delay (Days)</u>			<u>Totals</u>
		<u>1-30</u>	<u>31-60</u>	<u>Over 60</u>	
COC	Number Late	7	3	13	23
	% of Total	30.4	13.0	56.6	100%
Non-COC	Number Late	9	4	12	25
	% of Total	36.0	16.0	48.0	100%

The final data presentation and analysis conducted for this study was in the area of terminations for default.

The objective of this portion of the research project was to determine to what extent contractor defaults have been evident in contracts awarded under issuance of a COC as compared to those contracts awarded without issuance of a COC.

Data collected for those 42 COC contracts which were considered usable for analysis indicated that there were four contracts (9.5 percent) in which termination for default proceedings had been initiated. As Table 8 indicates, this 9.5 percent appears to be in sharp contrast with the 2.5 percent non-COC contracts for which termination for default proceedings were initiated. The statistical significance of this apparent difference is elaborated upon more fully in the next section.

Table 8
Initiations of Termination for Default

	Total Contracts Usable for Analysis	Terminations for Default	Percent of Total
COC	42	4	9.5
Non-COC	40	1	2.5

Findings

As explained in Chapter III, Methodology, the first research hypothesis tested was:

There is no significant difference between the proportion of late deliveries among contracts performed under issuance of a COC as compared to the proportion of late deliveries among contracts performed without issuance of a COC. In other words,

$$H_0: \pi \text{ with COC} - P \text{ without COC} = 0$$

$$H_1: \pi \text{ with COC} - P \text{ without COC} \neq 0$$

The results of the data analysis on delivery delinquencies, taken from Table 6, are displayed in Table 9.

Table 9

Contract Delinquencies

	Contracts Usable for Analysis	Number on Schedule	Number Delinquent	Percent Delinquent
COC	42	19	23	54.8
Non-COC	40	15	25	62.5

The formula utilized to construct the 95 percent confidence interval around P (proportion of non-COC contracts with late deliveries) to see if it included π (proportion of COC contracts with late deliveries) was, as described in Chapter III:

$$P \pm t_{.025} \sqrt{\frac{P(1-P)}{n} \cdot \frac{N-n}{N-1}}$$

Using this formula, the 95 percent confidence interval around P was calculated to be:

$$C.I. = .625 \pm 2.021 \sqrt{\frac{.625(1-.625)}{40} \cdot \frac{160-40}{160-1}}$$

$$C.I. = .625 \pm .134$$

$$C.I. = .491 \text{ lower limit and } .759 \text{ upper limit}$$

Since the parameter π (.548) was found to lie within the confidence interval established around the statistic P (.491 to .759) we cannot reject the null hypothesis, H_0 : π with COC - P without COC = \emptyset . That is to say, there appears to be no significant statistical difference in the proportion of delivery delinquencies between those contracts awarded under issuance of a COC as compared to those contracts awarded without issuance of a Certificate of Competency.

The second research hypothesis tested was:

There is no significant difference between the proportion of contractor defaults among contracts performed under issuance of a COC as compared to the proportion of contractor defaults among contracts performed without issuance of a COC. That is to say,

$$H_0: \pi \text{ with COC} - P \text{ without COC} = \emptyset$$

$$H_1: \pi \text{ with COC} - P \text{ without COC} \neq \emptyset$$

The results of the data analysis on terminations for default, taken from Table 8, are reproduced in Table 10.

Table 10
Initiations of Termination for Default

	Total Contracts Usable for Analysis	Terminations for Default	Percent of Total
COC	42	4	9.5
Non-COC	40	1	2.5

Following the same procedures initially described in Chapter III and utilized above for delivery delinquencies, the 95 percent confidence interval around P was calculated to be:

$$C.I. = .025 \pm 2.021 \sqrt{\frac{.025(1-.025)}{40} \cdot \frac{160-40}{160-1}}$$

$$C.I. = .025 \pm .043$$

$$C.I. = -.018 \text{ lower limit and } .068 \text{ upper limit}$$

In this test the parameter π (.095) was found to lie outside of the confidence interval established around the statistic P (-.018 to .068). Therefore, the researchers must reject the null hypothesis, $H_0: \pi$ with $COC - P$ without $COC = 0$. In other words, there appears to be a significant statistical difference in the proportion of terminations for default between those contracts awarded under the issuance of a COC as compared to those contracts awarded without issuance of a Certificate of Competency.

The conclusions that may be drawn from the above described test results are elaborated upon more fully in Chapter V, Summary, Conclusions, and Recommendations.

The following chapter presents a research summary, study conclusions, and recommendations for further research.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents a summary of the research accomplished, describes the conclusions drawn from the findings, and offers recommendations for further research.

Summary

The objective of this research was to examine contract information from the five ALCs to determine if COC procedures have an adverse impact on ALC contracting with respect to contractor performance. To satisfy this objective, contractor performance data were obtained from the ALCs and the administering DCASMA to answer the following questions:

1. To what extent has poor contractor performance, with respect to late deliveries and contractor default, been evident in cases in which COCs have been issued?
2. To what extent has poor contractor performance, with respect to late deliveries and contractor default, been evident in cases in which referrals to the SBA were made, but no COCs were issued?
3. Is there a significant difference in contractor performance under each of the two categories mentioned above?

For the purposes of data analysis, contractor late delivery was defined as a delinquent delivery regardless of the length of delay. Information on the length of delinquencies was collected, however, and is discussed as a corollary finding in the next section of this chapter. Contractor default was measured by whether or not termination for default proceedings were initiated against the contractor.

Performance data covering Fiscal Years 1976 through 1978 were gathered on 42 COC and 40 non-COC contracts. They were analyzed statistically with the following findings:

1. The hypothesis that there is no significant difference in contractor performance with respect to late deliveries between COC and non-COC cases could not be rejected. The data showed that of the 42 COC contracts examined, 23, or 54.8 percent, involved late deliveries. Of the 40 non-COC contracts, 25, or 62.5 percent, were delinquent.

2. The hypothesis that there is no significant difference between COC and non-COC cases with respect to default initiation was rejected. This finding, that there was a significant difference in terms of default, is based on the initiation of default proceedings in four COC cases versus only one default initiation in the non-COC cases.

Conclusions

The above findings appear to support a conclusion that, although there is no significant difference in impact on the ALCs between COC and non-COC cases in terms of late deliveries, there is a significant difference in terms of the seriousness of the problems as measured by default initiation. It is not possible to make any resultant inferences as to the quality of the SBA's COC Program, however, unless several factors which may have influenced the performance results are examined.

With respect to the number of delinquent deliveries, the findings showed no significant difference between performance under COCs and performance in the non-COC cases. Since COCs are only issued in cases where the contracting officer has doubts about the contractor's ability to complete the contract satisfactorily, the researchers intuitively felt that it was likely that delivery performance would be worse under COC issuance.

The finding that there is no significant difference in the number of late deliveries could possibly be attributed to positive influences of the SBA's COC Program. First, the knowledge that they were performing under a COC may have motivated those companies to expend extra effort in order to overcome possible shortcomings. Second, there is a possibility that the SBA may have provided needed

post-award guidance and assistance to those companies to which it awarded COCs.

On the other hand, there is a possibility that the ALC contracting officers and the DCAS contract administrators may have had to spend extra time and effort, at a cost to the Government, to ensure that the COC contracts were completed on time. A suggested topic for further research in this area appears in the next section of this chapter. Another possible negative factor is that the number of contract modifications to permit delivery extensions may have been greater for the COC cases than for the non-COC cases.

A determination of the extent to which the above influences, both positive and negative, may have applied was not made, primarily because it was beyond the purview of this research, but also because time limitations precluded such an in-depth analysis. Nevertheless, it is concluded that there is no significant difference between the number of late deliveries under COC contracts and the number of late deliveries where COCs were not issued.

The severity of the performance problems between the two categories of contracts, as measured by the initiation of default proceedings, is another matter. As mentioned, the analysis showed a significant difference in the number of default initiations, based on four such cases under COC contracts and only one under the non-COC contracts.

A conclusion that the severity of contract problems is likely to be greater under COC issuance is apparently strengthened by the corollary findings on the length of delays shown in Table 7. Although the statistical significance of the data was not tested, the findings indicate that the percentage of COC contracts in the "Over 60" day delay category is 8.6 percent higher than the percentage of non-COC contracts in that category.

In summary, it is concluded that the COC program has no apparent impact on the ALCs in terms of the number of delivery delinquencies. However, with respect to the severity of the problems encountered, as measured by default proceedings, the impact is greater for the COC contracts than for the non-COC contracts.

Recommendations for Further Study

During the course of this research, several topics for additional study were uncovered by the researchers or suggested by interested outside activities. A few of these topics, felt to be most significant by the researchers, are presented for consideration.

1. The conclusion of this study is that although there is no significant difference in the number of late deliveries between COC and non-COC contracts, the severity of the problems encountered is greater under COCs. A potential area for further research is an examination of

the actual dollar costs or savings to the Air Force resulting from the COC program. The study would initially entail a look at both COC contracts and comparable non-COC contracts in terms of both contract administration costs and the costs resulting from inadequate performance and default proceedings. These costs would then be measured against the savings resulting from the award to low bidders under COCs versus award to the second low bidder when COCs are not issued. This kind of cost tradeoff study would serve as a measurement of the overall cost or savings to the Air Force resulting from the COC program.

2. Table 3b shows that the percentage of referrals to the SBA that have culminated in the award of COCs has been declining over the past three fiscal years. The table shows that of the ALC referrals to the SBA, the number resulting in COCs has declined from 37.7 percent in FY 1976 to 20.7 percent in FY 1978. A study could be made to determine the reasons for this decline. Possible reasons are that the SBA is tightening the criteria it applies in evaluating small business concerns or that the Air Force is relaxing its acceptance criteria. One corollary finding made by the researchers was that the number of cases in which a firm that is referred to the SBA declines to file for a COC has been growing steadily. For the period of FY 1976 through FY 1978, it was found that in approximately 52 percent of the instances in which COCs were not issued,

the reason was that the firm referred to the SBA did not elect to file for a COC. In FY 1978 alone, the figure was 72 percent. This might indicate that many small business firms are simply "throwing in" bids and then withdrawing when challenged. It might, on the other hand, indicate that a toughening of SBA criteria is causing more and more firms to reconsider applying for COCs.

3. A surprising discovery to the researchers was the high percentage of delinquent deliveries in both sub-population groups studied. It is not known whether the delinquency rates are representative of all awards to small business or, for that matter, how these delinquency rates compare with those for awards to large business firms. To answer questions such as these, a study might be made of the extent and causes of contract delivery delays on Air Force contracts, in general, to include large businesses.

The completion of these additional research projects would further expand our understanding of contractor performance.

APPENDIX A
REQUEST FOR CONTRACT INFORMATION

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE LOGISTICS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433



REPLY TO
ATTN OF: PMB

SUBJECT: Request for Contract Information

9 FEB 1979

TO: OC-ALC/BC OO-ALC/BC SA-ALC/BC SM-ALC/BC WR-ALC/BC

1. A research team at the Air Force Institute of Technology, here at Wright-Patterson AFB, is attempting to examine sample contract results to see if there is any significant statistical difference between contractor performance where a certificate of competency (COC) was issued and performance where the contracts were awarded to other bidders because the COC was not issued.

2. The researchers have chosen their sample cases for follow-up from the quarterly Air Logistics Center COC reports. In many individual cases, however, the only identifying information available is the name of the company referred to the SBA and the solicitation (RFP) number. In order to track the final results, the research team will need the resultant contract numbers and the name of the contractor.

3. Attached is a list of cases chosen for the research sample. Request you provide, for each case, the contract number and the name of the firm receiving the contract. Please reply to Major Charles Simko, AFIT/LSG, Wright-Patterson AFB, OH 45433. A pre-addressed envelope has been included for your convenience.

4. Your help in providing this information will be a key factor in the successful completion of the research. A reply by 23 February 1979 will be greatly appreciated.

FOR THE COMMANDER

ROBERT B. KENNEDY
Executive for Small Business
Ofc of DCS/Contracting & Manufacturing

1 Atch
Information Request

AFLC - Lifeline of the Aerospace Team

APPENDIX B
REQUEST FOR CONTRACTOR PERFORMANCE INFORMATION

DEPARTMENT OF THE AIR FORCE
AIR FORCE INSTITUTE OF TECHNOLOGY (ATC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433



REPLY TO
ATTN OF: LSGM

SUBJECT: Request for Contractor Performance Information

TO: OC-ALC/PMXS OO-ALC/PMXS SA-ALC/PMXS
SM-ALC/PMXS WR-ALC/PMXS

1. Two students of the Air Force Institute of Technology are attempting to examine sample contract results to see if there is any significant difference between contractor performance under certificate of competency (COC) issuance and performance where COCs were not issued. The sample contracts were chosen from the quarterly Air Logistics Center COC reports.

2. We request your assistance in determining the adequacy of contractor performance. The attached chart lists the contract number and the name of the contractor for each of the sample contracts, along with a few questions concerning performance. Request you complete the chart and return it, in the enclosed pre-addressed envelope, to Major Charles Simko, AFIT/LSG-79A, Wright-Patterson AFB, OH 45433, by 23 April 1979.

3. Gaining the contractor performance information will be the key step in the successful completion of the research. It should be noted, however, that the research findings will not make reference to any contractor by name.

4. This research project has been coordinated with Mr. Robert Kennedy, the Hq AFLC Assistant for Small Business, as well as with Mr. Frey in AFLC/PMM and Major Huber in AFLC/PMX. If there are any questions regarding this request, please contact the undersigned at AUTOVON 785-5096. Your support of our educational mission is sincerely appreciated.

Jack L. McChesney
JACK L. MCCHESENEY, Lt Col, USAF
Assistant Professor of Logistics
Management
School of Systems and Logistics

1 Atch
Information Request

INFORMATION REQUEST

INSTRUCTIONS

The answers to the following questions are to be used in evaluating a contractor's delivery performance on a specific contract. For purposes of this study, a contract is delinquent when the contractor, within his control, has failed to deliver a quality product in a timely manner (i.e., in accordance with scheduled delivery dates specified in the original contract), either incrementally or finally, except when corrected, revised, or amended by a formal, signed contract change order or modification.

1. Did the contractor deliver the product in accordance with the scheduled delivery dates/shipping instruction specified in the original contract? Please circle the correct response.
2. If the answer to Question 1 is "NO", was the late delivery the fault of the contractor or the Government? What was the extent of the late delivery? Please circle the correct responses.
3. Were termination for default proceedings initiated for this contract? Please circle the correct response.

CONTRACT NUMBER	CONTRACTOR	QUESTIONS		
		1	2*	3
		YES/NO	<u>CNTRCTR/GOV'T</u> L.T. 30 Days/ 30 to 60 Days/ G.T. 60 Days	YES/NO
		YES/NO	<u>CNTRCTR/GOV'T</u> L.T. 30 Days/ 30 to 60 Days/ G.T. 60 Days	YES/NO
		YES/NO	<u>CNTRCTR/GOV'T</u> L.T. 30 Days/ 30 to 60 Days/ G.T. 60 Days	YES/NO
		YES/NO	<u>CNTRCTR/GOV'T</u> L.T. 30 Days/ 30 to 60 Days/ G.T. 60 Days	YES/NO
		YES/NO	<u>CNTRCTR/GOV'T</u> L.T. 30 Days/ 30 to 60 Days/ G.T. 60 Days	YES/NO
		YES/NO	<u>CNTRCTR/GOV'T</u> L.T. 30 Days/ 30 to 60 Days/ G.T. 60 Days	YES/NO
		YES/NO	<u>CNTRCTR/GOV'T</u> L.T. 30 Days/ 30 to 60 Days/ G.T. 60 Days	YES/NO
		YES/NO	<u>CNTRCTR/GOV'T</u> L.T. 30 Days/ 30 to 60 Days/ G.T. 60 Days	YES/NO
		YES/NO	<u>CNTRCTR/GOV'T</u> L.T. 30 Days/ 30 to 60 Days/ G.T. 60 Days	YES/NO

* L.T. = "Less Than"
G.T. = "Greater Than"

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